ELEMENT OF WARRANTY OF IBS STRUCTURAL SYSTEM FOR CONSTRUCTION INDUSTRY

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To my beloved mother, father, brother

and

Lecturer

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ABSTRACT

Industrialized building system (IBS) is the prefabrication and industrialized construction concept in Malaysia. It is famously around 20 century for the construction project. IBS is a building pre-cast component that done by manufactory and transport to the site for assembly to the construction project. In this country, any building after completion doesn't have any warranty by developer or contractor even it's used the IBS system. Its difference to the mechanical sector that it's has a warranty for each component after purchased or even after the assembly. Nowadays, the construction sector had a life span for long time which is 50 years after the completion of the project. So, the study is conduct to create the warranty of IBS component for construction industry same as the mechanical sector and to estimate how the possible warranty period should gives for the IBS component in the construction in Johor, Malaysia by using a data collection from load test data by the laboratory experiment. According to the result and analysis, the warranty period for the IBS structure should be 15 to 20 years.

ABSTRAK

Industrialized building system (IBS) merupakan satu konsep yang digunakan dalam industry pembinaan di Malaysia. Ia terkenal di sekitar tahun 20-an dan digunakan di dalam projek pembinaan di Negara ini. IBS merupakan satu teknik dimana komponen atau elemen bangunan dihasilkan oleh kilang kemudian dipindahkan ke tapak untuk pemasangan pada projek pembinaan. Di negara ini, mana-mana bangunan selepas siap tidak mempunyai apa-apa jaminan oleh pemaju atau kontraktor walaupun ia menggunakan sistem IBS. Ia adalah berbeza dengan sector mekanikal dimana setiap komponen yang dihasilkan dikilang mempunyai satu tempoh warranty atau jaminan walaupun ianya telah dipasang kepada satu elemen yang lain. Sehingga kini, sektor pembinaan hanya mempunyai jaminan jangka hayat untuk masa yang lama iaitu 50 tahun selepas tamat projek. Ia merupakan satu masa yang agak panjang dimana guaranty ini diberikan kepada sesebuah bangunan. Maka, kajian ini adalah untuk mewujudkan jaminan atau warrantykepada setiap komponen IBS bagi industri pembinaan sebagaimana yang dipraktikkan oleh sektor mekanikal dan kajian ini juga adalah untuk menganggarkan tempoh jaminan yang mungkin sesuai diberikan kepada komponen IBS di dalam industri pembinaan di Johor, Malaysia dengan menggunakan pengumpulan data daripada ujian makmal berkenaan dengan beban terhadap struktur bangunan. Berdasarkan data dan analisis yang dibuat, tempoh waranti yang perlu untuk struktur berkenaan adalah antara 15 hingga 20 tahun.

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INTRODUCTION

1.1 Introduction

Industrialized building system or IBS is defined as the complete assembly construction. The construction will done where component or structure of building are manufactured at factories on or off site than, the structures are transported and assembled into a structure with minimum work and also workers. (CIDB, 2003)

An advantages of precast concrete structures such as control of quality, efficiency use of materials, better management of construction, and saving the cost (Megally et al., 2002).Demand are witness of necessity toward more construction space at sites, labour, longer waiting time for concrete curing and hardening and weak on quality control in conventional cast in situ construction had seems to be replaced at a slow pace, by a wide scale use of the precast concrete systems.

Construction industry development board (CIDB) has classifiedIBS in to five groupnamely precast concrete wall building, steel formwork system, reinforced concrete building with precast concrete slab, steel frame building, steel frame building and steel roof truss.(Nor Hamzeh, June 2010).

IBS is not new in Malaysia and have been around since the early sixties. The first pilot project was initiated by the Government and it was along Jalan Pekeliling which involved 3,000 units of low cost flats and 40 shop lots. However, developments in IBS after that failed to gain support from the industry and consumers. From a survey

done by CIDB on 2003, it was found that the percentage usage of IBS in the local construction industry is only at a mere 15%. However, several major world class developers in Malaysia have used some percentage of IBS in their projects. Several projects that use IBS can be seen as follows:

i. KLIA
ii. Government Quarters in Putrajaya
iii. Petronas Twin Tower, and
iv. KL Sentral

In the process of develop and more efficient building technologies in the construction industry, the Malaysian construction industry is moving towards the adoption of IBS to create a shorten construction period, lower costs, to ensure better construction quality, to save the use of workers and also to reduce wastage of material.

The IBS construction process is a utilizes techniques, products, components, or building systems which involve prefabricated components and on-site installation. From the structural classification, there are five IBS main groups identified as being used in Malaysia, and these are:

Pre-cast Concrete Framing, Panel and Box Systems

Pre-cast columns, beams, slabs, 3-D components (balconies, staircases, toilets, lift chambers), permanent concrete formwork, etc;

Pre-cast Concrete Framing, Panel and Box Systems

Pre-cast columns, beams, slabs, 3-D components (balconies, staircases, toilets, lift chambers), permanent concrete formwork, etc;

Steel Formwork Systems

Tunnel forms, beams and columns moulding forms, permanent steel formworks (metal decks, etc;

Steel Framing Systems

Steel beams and columns, portal frames, roof trusses, etc;

Prefabricated Timber Framing Systems

Timber frames, roof trusses, etc;

Block Work Systems

Interlocking concrete masonry units (CMU), lightweight concrete blocks, etc.

1.2 Warranty

Warranty in term of business according to the legal transaction means an assurance by one party to the other party that specific facts or conditions are true or will happen to the other party is permitted to rely on that assurance and seek some type of remedy if it is not true or followed.

In the real estate transaction, warranty is an agreement that the buyer's title to a parcel of properties will be defended. A limited warranty deed, on the other hand, is a promise that the title will be defended against a limited set of claims which is usually claims arising from encumbrances executed by the grantor. Thus, a general warranty deed binds the grantor to defend the title against all claims even those arising from previous owner which is contractor or developer in term of construction field. A limited warranty deed typically only binds the grantor to defend the title against claim arising from when the grantor held title to the property. A warranty may be express or implied depending on what you bought or type of business.

1.3 Guarantee

Guaranty is an agreement by which one party assumes the responsibility of assuring payment or fulfillment of another's debts or obligations. The guaranty can be a product or services.

According to the Moss Magnuson Act 1985, warranty and guarantee is the same thing but guarantee is a document to protect the consumer rights. It is a promise by a seller with a buyer for complete replacement of the item or product. Commonly guarantee is valid for a fixed period of time. It has a legal status, even if they do not pay for or it was offered free of cost by a seller.

Warranty is also a legal document that protects consumer rights. It is more or less like insurance policy for that we have to pay certain amount to come into legal contract. So on the basis of this legal bond the company can be taken to court if it does not bound what has been agreed in the warranty document. Warranty covers only repair of the article. Guarantee is more in manufactures in term of side of legality.

1.4 Problem Statement

IBS provides the opportunity for the players in the construction industry to develop a new image of the construction industry to be at par with other manufacturing industries such as car and electronic industries. With the present conventional methods of construction, the industry is always associated with many unprofessional practices. The adoption of IBS promises to elevate every level of the industry to a new height and image of professionalism.

Knowledge in construction technology is equally important especially for the IBS component. There many cases are involved to the building projects are awarded and constructed using IBS system but were carried out with many difficulties. For example, in the case of Pekeliling Flats in Kuala Lumpur and Taman Tun Sardon,

Gelugor, Penang. The problems encountered are crack of the components because of strength or load that normally involved the beam and column, and also for junction between beam-to-column and column-to-base connections.

Figure 1.1 Crack of the structure because of building load and poor of connection during assembly

These problems arise due to the fact that the parties involved in the construction underestimate the important of accuracy in setting out the alignment and leveling of the bases. Other related technical issues are lack of knowledge capability in designing the details of ties and connections of the pre-fabricated components particularly in precast concrete construction. Poor connection system may cause problem to site work such that the connections cannot be joined properly due to poor construction details.

Because of these problems, the IBS component should to have any warranty to cover when some damages of failure structure happen. Warranty of the product means a promise the good condition of the product and states that the maker is responsible for repairing or replacing the product usually for a certain period of time after it's purchased and also after assembly to the building structure. But, in the conventional system, the supplier did not give any warranty for the element but the building had life span for fifty (50) years after the handover of the project (Orange Book,CIDB).

Because of warranty in the IBS component, the developer just give a certain time period to responsible the part of element after purchase and assembly to the building structure same as an others manufacturing sector that they give a warranty for certain period after purchased of the product.

1.5 Objective of the study

The objective of the study for a developing warranty of IBS system for building structure in construction industry should be:

i. To determine a warranty period based on reliability assessment of IBS structural system for each component that use in assembly of construction project.

ii. To study the reliability of IBS structural system

1.6 Scope of Work

The study will be covered of the IBS manufactured in Johor, Malaysia. The scope of data collection in this study will be conduct by a interview from IBS manufactured in Johor area.

1.7 Question of the Study

To complete of the study, there are some of question of the study that using to guide to conduct the study to achieve the objective of the study. The questions are:

i. Is it possible to change a guaranty to warranty for IBS system in construction industry?

ii. What is the factor effecting guaranty and warranty in the IBS system?

iii. How much warranty that should give for the IBS component in the construction project?

iv. When the warranty should be start?

v. What is the definition of guaranty and warranty of IBS system?

1.8 Significant of the Study

The significant of the study is mitigate the maintenance cost for developer or client using the guarantee because they must to responsible the project or building for long time even though the liability period of the project or building are finished. The study also can change the type of bond from the guarantee for long term period to the warranty which is short term period insurance.

1.9 Arrangement of Report

The study report consists of five chapters where the content of each chapter are summarized as follows:

Chapter 1 consist of introduction of the entire study and provides an overall view of the study. It covers the introduction, problem statement, aim and objectives of study, scope of the study, significance of the study and arrangement of report.

Chapter 2 focus in literature review that based on findings from various different sources of information such as journal, technical papers, books, research paper etc. This chapter includes introduction, definition of IBS system, warranty, guaranty, the implementation of IBS in Malaysia, the policy of warranty and etc.

Chapter 3 describe in detail on the methodology of study which covered all the stages in preparation of this study report.

Chapter 4 analysed the data using frequency analysis and average index analysis from the data collected. Chapter 4 also will discuss in detail all the data analysed and the findings will be highlighted.

Chapter 5 concludes all the finding which leads to the achievement of the objectives of the study. This chapter also suggests some recommendation for further study.

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